Answer any two of the following:

1. a) $Z = f(x, y) = x^a y^b$. Check whether Z is a quasiconcave or a quasiconvex function.

   b) Show that budget set of the consumer is a convex set.   3+2

2. a) State Envelope Theorem with reference to Maximum Value Function.

   b) By applying Envelope Theorem show that expenditure function is concave in commodity prices.

   2+3

3. a. Is the following equation exact?

   $(2Y + 3t^2) \, dy + 3tY \, dt = 0$

   b. Solve the equation: $y''(t) - 4y'(t) + 4y = 0$ given that $y(0) = 6, y'(0) = 8$ 2+3

4. a. Given the demand and supply functions as follows, find the equilibrium price and the time path of price. Determine whether the equilibrium is stable or not.

   $D_t = 19 - 6 P_t, S_t = -5 + 6 P_{t-1}$

   b. Find the solution: $y''(t) - 4y'(t) + 8y = 0$, $y(0) = 3$, $y'(0) = 7$ 2+3